

U.S. Serial No. 09/869,981
Response to First Office Action after RCE dated 6/4/04
Attorney Docket No. GJH-0002 (P1997J057H)

REMARKS

REJECTION UNDER 35 U.S.C. 103

Claims 1-23 have been rejected under 35 U.S.C. 103(a) as being obvious in light of United States Patent Number 4,902,404, Teh Ho ("Ho") in view of United States Patent Number 4,392,945, Howard et al. ("Howard").

EXAMINER'S POSITION

The Examiner takes the position that Ho discloses a process for hydrotreating a hydrocarbon feed by feeding the feed into a first hydrotreating zone, which is operated in the presence of hydrogen and a catalyst, to remove sulfur from the feed. The effluent from the first hydrotreating zone is then passed into a second hydrotreating zone to produce a final product. The bulk multimetallic catalyst in the second hydrotreating reaction zone comprises a metal of Group VIII such as Ni and two metals of Group VIB such as Mo and W. The Examiner notes that Ho does not specifically disclose that the ratio of Group VIB metals to Group VIII non-noble metal is from about 10:1 to about 1:10. However, the Examiner states that Ho discloses that the bulk metal catalyst comprises from about 0.5-20 wt.% Group VIII metal and about 5-30 wt.% of Group VIB metals. Thus, the Examiner takes the position that the ratio of Group VIB to Group VIII non-noble metals would fall within the presently claimed range.

The Examiner notes that Ho does not specifically disclose the amount of sulfur present in the first stage effluent, but the Examiner takes the position that this feature would be expected in the Ho process. The Examiner also further notes that Ho does not teach separation stages between the first and second hydrotreating zone. Thus, the Examiner has cited Howard as teaching this feature.

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APPLICANTS' POSITION

It is applicants' position that one having ordinary skill in the art and knowledge of Ho and Howard at the time the invention was made would not have found it obvious to arrive at the presently claimed invention.

The presently claimed invention is a two-stage hydroprocessing process wherein both the first and second reaction stages contain one or more reaction zones. In the first stage of the presently claimed invention a feedstream is reacted with a hydroprocessing catalyst in the presence of a hydrogen-containing treat gas. A liquid product stream having less than 3000 wppm sulfur results from the reaction in the first reaction stage. This liquid product stream is passed to a separation stage, and the liquid phase product stream from the separation stage is passed to a second hydroprocessing stage. In the second hydroprocessing stage, the liquid phase product stream is contacted with a second hydroprocessing catalyst in the presence of a hydrogen-containing treat gas. The liquid product resulting from the reaction in the second reaction stage is then passed to a separation stage and the second vapor and liquid phase product stream are collected from the second separation stage. In the second reaction stage, at least one of the stages contains a bulk multimetallic catalyst comprised of at least one Group VIII non-noble metal and at least two Group VIB metals. The ratio of Group VIB metals to Group VIII non-noble metal is from about 10:1 to about 1:10.

Applicants concede that Howard teaches to use separation steps. Ho, however, teaches a process wherein a feed is contacted in a first catalyst zone with a catalyst comprised of at least one metal selected from Group VIB and at least one metal selected from Group VIII of the periodic table on an inorganic oxide support. The treated

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feedstream from the first catalyst zone is conducted to a second catalyst zone wherein it is contacted with a catalyst represented by the formula MM'_aS_x derived from the precursor $ML(MO_yW_{1-y}A_4)_a$.

The Examiner has stated that Ho discloses a process using a bulk metal catalyst in the second comprising from about 0.5-20 wt.% Group VIII metal and about 5-30 wt.% of Group VIB metals. However, applicants respectfully disagree with the Examiner. Ho discloses at col. 3, line 35 through col. 4 line 3 that the catalyst in the first catalyst zone of Ho comprises a metal of Group VIII such as Ni and two metals of Group VIB such as Mo and W. Ho continues at col. 3, lines 50-57 that these catalyst can contain from about 0.5-20 wt.% Group VIII metal and about 5-30 wt.% of Group VIB metals. However, as stated above, this section of Ho is describing the catalyst of the first catalyst zone of Ho, and the catalyst in the first catalyst zone is a supported catalyst, as described at col. 3, line 40 and lines 58-60.

The catalyst of the second reaction stage of Ho, must possess a specific formula, noted above, and be derived from a specific precursor. In this formula M is Cr and/or one or more promoter metals selected from the group consisting of Mn, Fe, Co, Ni, Cu, and Zn, and M' is one or both of Mo and W.

Thus, applicants take the position that neither Howard nor Ho, alone or in combination, obviates the presently claimed invention. Neither Howard nor Ho teach a two stage hydroprocessing process as is presently claimed wherein at least one of the stages in the second reaction zone contains a bulk multimetallic catalyst comprised of at least one Group VIII non-noble metal and at least two Group VIB metals. Wherein, the ratio of Group VIB metals to Group VIII non-noble metal of the bulk multimetallic is

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from about 10:1 to about 1:10. While the Examiner has stated that Ho discloses that the bulk metal catalyst used therein comprises from about 0.5-20 wt.% Group VIII metal and about 5-30 wt.% of Group VIB metals, applicants, as stated above, have pointed out to the Examiner that this particular metals content, etc of Ho is referring to a supported catalyst, not a bulk multimetallic catalyst.

Thus, applicants further take the position that neither Ho nor Howard teach a two-stage hydroprocessing process wherein at least one of the stages in the second reaction zone contains a bulk multimetallic catalyst comprised of at least one Group VIII non-noble metal and at least two Group VIB metals having a ratio of Group VIB metals to Group VIII non-noble metal of the bulk multimetallic is from about 10:1 to about 1:10. As illustrated in Examples 6 and 7, this ratio has an impact on the effectiveness of the bulk multimetallic catalysts.

Therefore, applicants take the position that neither Ho nor Howard, alone or in combination obviate the presently claimed invention because neither teaches a two-stage hydroprocessing process wherein at wherein at least one of the stages in the second reaction zone contains a bulk multimetallic catalyst comprised of at least one Group VIII non-noble metal and at least two Group VIB metals, wherein, the ratio of Group VIB metals to Group VIII non-noble metal of the bulk multimetallic is from about 10:1 to about 1:10.

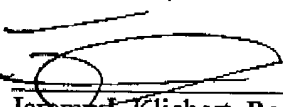
The Examiner is requested to reconsider and withdraw this rejection.

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Based on the preceding arguments, the Examiner is requested to reconsider and withdraw all rejections and pass this application to allowance. The Examiner is encouraged to contact applicants' attorney should the Examiner wish to discuss this application further.

Respectfully submitted:

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